

# NEXUS

A platform for the next-generation of nuclear data evaluations

## Features:

Bayesian Optimization • Version Control • Modularized with Containers • Python 3+



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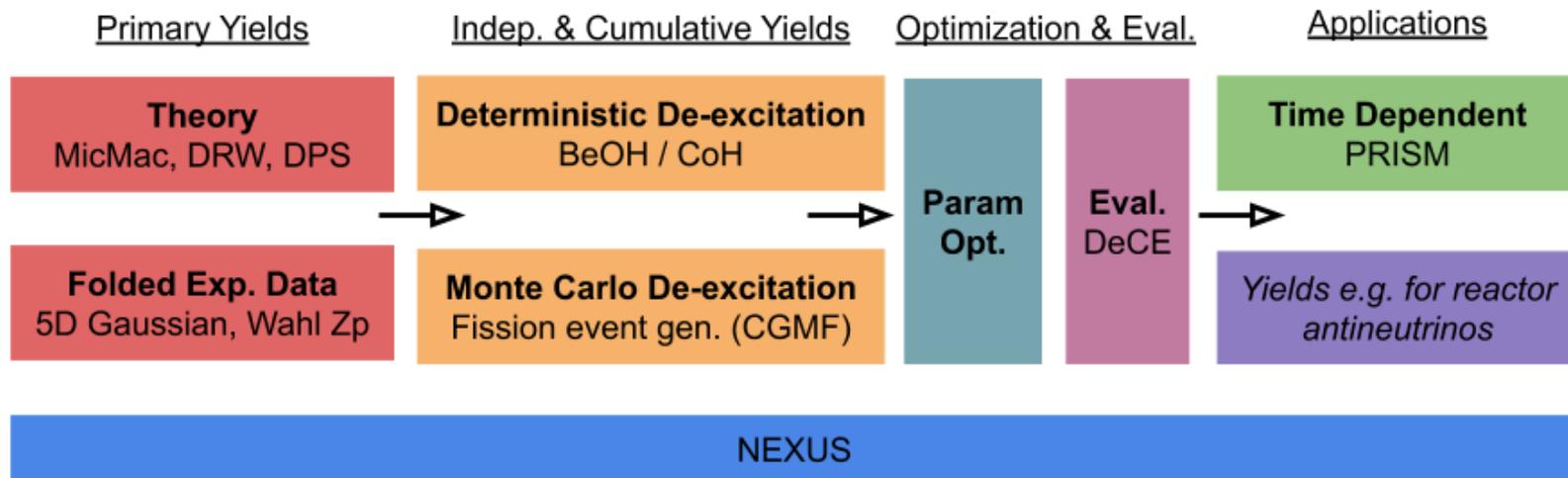


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# EXAMPLE EVALUATION WORKFLOW



Our current workflow combines many distinct codes and data

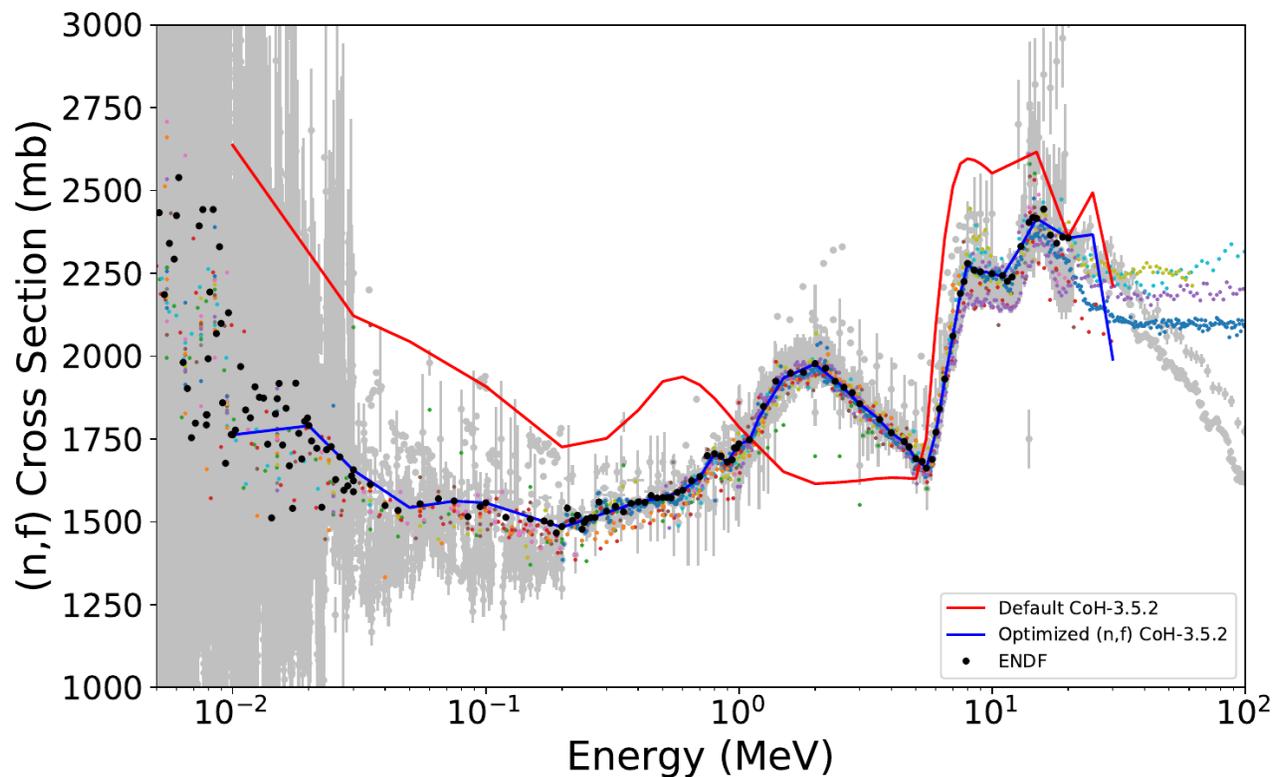
The problem: we need to integrate all of these interrelated parts together

**NEXUS** provides

**code structures** and **marshalling** that allow **theory**, **data** and **evaluation** to seamlessly communicate

# PU SUITE EVALUATION

Focus on consistency in evaluating all reaction channels together



**Figure:**  $^{239}\text{Pu}(n,f)$  cross section. Regularization procedure maps model to experimental data (red  $\rightarrow$  blue)

Parsed ENDF, EXFOR, ran reaction model, optimized model parameters all with less than 50 lines of Python3 code!

Evaluation effort now capable of utilizing HPC machines; combination of CPU / GPU based emulators

# WHAT'S NEW?

Focus on consistency throughout evaluation

## New Data

New ChiNu data for Prompt Fission Neutron Spectrum (PFNS)

TPC data for fission cross section (in coordination with IAEA)

## New Theory (model improvements)

Evaluate prompt-nu and FPY in a consistent way with the PFNS evaluation [CGMF / BeoH]

Include prompt fission  $\gamma$ -rays (PFGS) [BeoH]

New inelastic scattering model using the Engelbrecht-Weidenmuller transformation [CoH]

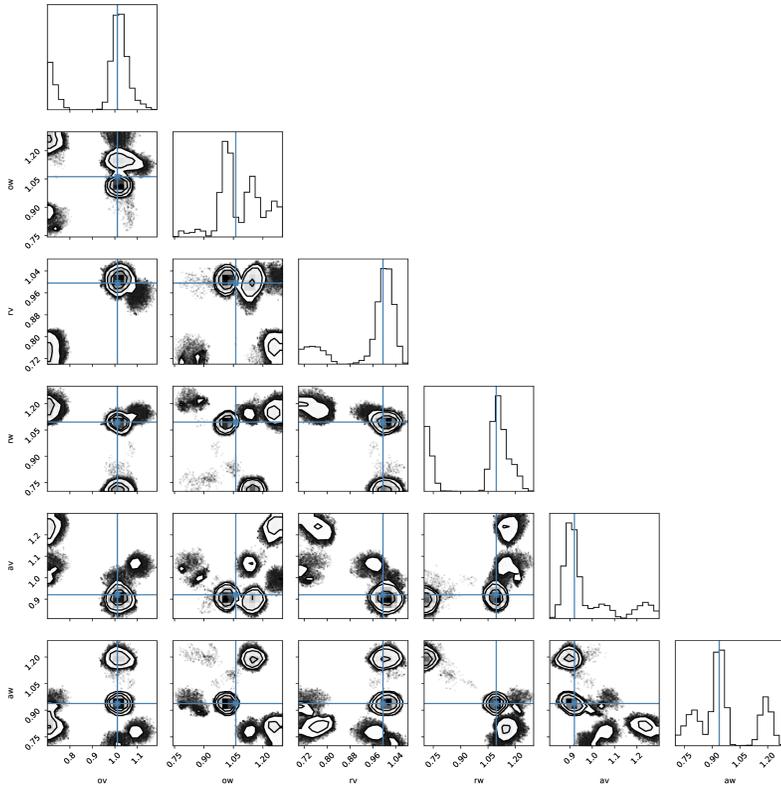


Figure: Bayesian opt. of optical model parameters with the NEXUS code